I. Metallic Bonds

A. Metals form crystal lattices and can be modeled as cations surrounded by a "sea" of freely moving electrons

B. Metallic Bonds

1. Metals share several properties w/ ionic compounds
   → metals often form crystal lattices

C. A sea of electrons

1. Metal atoms do not share valence electrons w/ neighboring atoms or lose their val. electrons; their outer energy levels overlap

D. Electron Sea Model - proposes that all the metal atoms in a metallic solid contribute their valence electrons to form a "sea" of electrons; which surrounds metal cations in the lattice

E. Electrons in the outer energy level are not held to a specific atom, but float freely from one atom to the next

1. Delocalized electrons - electrons in metals that move freely
2. Metallic bond - the attraction of a metal's cations with the delocalized electrons

→ we can explain different physical properties (mp, bp) w/ metallic bonding

F. Malleability, ductility, and durability

→ all of these physical characteristics have to do metallic bonding

G. Electrical conductivity - delocalized (mobile) electrons allows heat to be transferred easily (or electricity)

H. The more delocalized electrons in a metal the higher the degree of strength & hardness

II Alloys - a mixture of elements that have metallic properties
→ Two types: substitutional and interstitial

A. Substitutional - atoms of the original metal are replaced by atoms of another metal

B. Interstitial - small holes in metallic crystal are filled w/ atoms of another metal
(ex: carbon steel)